Claims

- [c1] What is claimed is:
 - 1. A probe for improved homogeneity in magnetic resonance (MR) imaging, the probe comprising: an RF coil for receiving MR data; a collapsible housing enclosing the RF coil and constructed for insertion into a subject to be imaged; and a homogeneity enhancing material disposable within the collapsible housing.
- [c2] 2. The probe of claim 1 wherein the homogeneity enhancing material has a magnetic permeability similar to that of the subject.
- is an expandable membrane to allow the RF coil to receive MR data from a wider area of the subject when expanded with the homogeneity enhancing material then would be otherwise.
- [c4] 4. The probe of claim 1 wherein the homogeneity enhancing material includes one of a gel and a liquid.
- [05] 5. The probe of claim 1 wherein the homogeneity enhancing material includes a material having a magnetic

- permeability similar to that of water.
- [c6] 6. The probe of claim 1 wherein the homogeneity enhancing material includes a perfluorocarbon material.
- [c7] 7. The probe of claim 3 wherein the homogeneity enhancing material expands the collapsible housing after insertion into the subject to be imaged.
- [08] 8. The probe of claim 7 wherein the collapsible housing is constructed free of gases.
- [09] 9. The probe of claim 1 formed as an endorectal probe.
- [c10] 10. The probe of claim 1 further comprising an inflatable retainer that secures the RF coil within the subject to be imaged when inflated with the homogeneity enhancing fluid.
- [c11] 11. An MR imaging apparatus comprising:
 a plurality of gradient coils positioned about a bore of a
 magnet to impress a polarizing magnetic field;
 an RF transceiver system;
 an RF switch controlled by a pulse module to transmit RF
 signals;
 an RF coil assembly configured for internal MR image ac
 - an RF coil assembly configured for internal MR image acquisition and having at least one RF coil disposed within a housing that is constructed for insertion into a subject;

and

a homogeneity enhancing fluid disposable within the housing to improve homogeneity during internal MR image acquisition.

- [c12] 12. The MR imaging apparatus of claim 11 wherein the housing is an expandable membrane and the homogeneity enhancing fluid causes the expandable membrane to inflate.
- [c13] 13. The MR imaging apparatus of claim 11 wherein the homogeneity enhancing material has a magnetic permeability similar to that of the subject.
- [c14] 14. The MR imaging apparatus of claim 11 wherein the homogeneity enhancing fluid includes a perfluorocarbon material.
- [c15] 15. The MR imaging apparatus of claim 11 further comprising a control means to inflate the housing with the homogeneity enhancing fluid.
- [c16] 16. The MR imaging apparatus of claim 15 wherein the control means comprises a syringe.
- [c17] 17. The MR imaging apparatus of claim 15 wherein the control means comprises an electronically controlled pump.

- [c18] 18. The MR imaging apparatus of claim 15 wherein the control means automatically inflates the housing with the homogeneity enhancing fluid.
- [c19] 19. The MR imaging apparatus of claim 11 further comprising a retainer filled with the homogeneity enhancing fluid to secure the at least one RF coil within the subject.
- [c20] 20. A method of using an MR imaging device with improved homogeneity comprising:

 positioning an RF coil within a housing that is capable of being inserted within an imaging subject; and filling the housing with a homogeneity enhancing material.
- [c21] 21. The method of manufacturing of claim 20 further comprising attaching a pump to the housing to inflate the housing with the homogeneity enhancing material.
- [c22] 22. The method of manufacturing of claim 20 further comprising attaching an automated inflation control to control the inflation the housing with a homogeneity enhancing material.
- [c23] 23. The method of manufacturing of claim 20 wherein the homogeneity enhancing material comprises a perfluorocarbon material.

- 24. The method of manufacturing of claim 20 wherein the homogeneity enhancing material includes one of a gel and a liquid.
- [c24] 25.The method of manufacturing of claim 20 wherein the homogeneity enhancing material has a magnetic permeability similar to that of the imaging subject.
- [c25] 26. A kit for an MR imaging device with improved homogeneity comprising:

an RF coil;

a flexible housing configured to contain the RF coil therein and further configured to be inserted within an imaging subject; and

a supply of a homogeneity enhancing material to fill and expand the flexible housing after insertion into the imaging subject.